ADDENDUM REPORT to the Contract between the
Istituto Nazionale di Geofisica e Vulcanologia, sezione di Catania and CNR – Istituto di Matematica Applicata e Tecnologie Informatiche, sede di Milano

Guidelines to use the software PROSCEN (PRObabilistic damage SCENario) - Simulating intensity shake maps given the parameters on the location and the intensity of an earthquake for the Etna volcano area

prepared by

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Introduction

In the framework of the activities foreseen by the Research Unit 4 (Responsible Azzaro R.) of the project INGV-DPC 2007-2009 .V4 04-FLANK., a Contract was activated between INGV CT and IMATI MI (Responsible Rotondi R.).

This Addendum Report is given as documentation and guidelines for the use of the software implemented to simulate intensity shake maps given the parameters on the location and the intensity of an earthquake for the Etna volcano area. The software is delivered as executable codes (compiled in FORTRAN) for PC environment with some examples for training in the use. The software has to be intended as a research tool and used by expert users. There are two modules to accomplish the chain of the computation. For the presentation of final refined maps GIS tools have to be used.

Module ELLIPSE

To adopt elliptical isoseismal lines without losing the knowledge gained in the past we followed this procedure: first we transform the plane so that the ellipse having as maximum axis the length and the azimuth of the fault rupture is changed into a circle with fixed diameter, then the probabilistic model studied for the isotropic case is applied to the so modified data (see Figure 1).

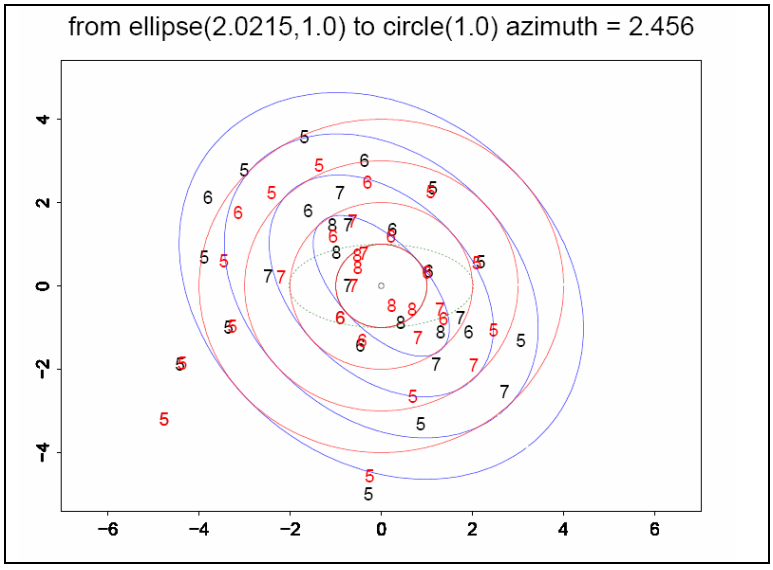
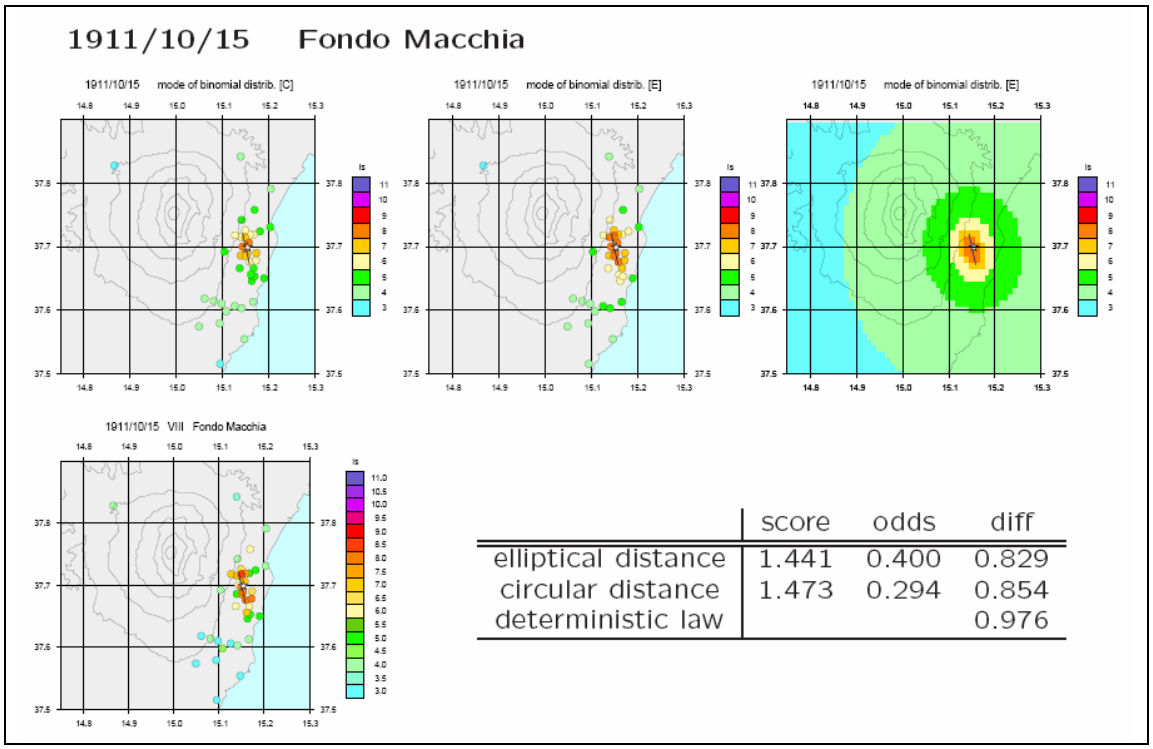


Fig. 1 Blue ellipses are transformed into Red circles

Module SCEN

The software module estimates the probability distribution of the macroseismic intensity at site under the assumption of anisotropic attenuation, given the parameters on the fault location and the intensity of the shock.



	score	odds	diff
elliptical distance	1.441	0.400	0.829
circular distance	1.473	0.294	0.854
deterministic law			0.976

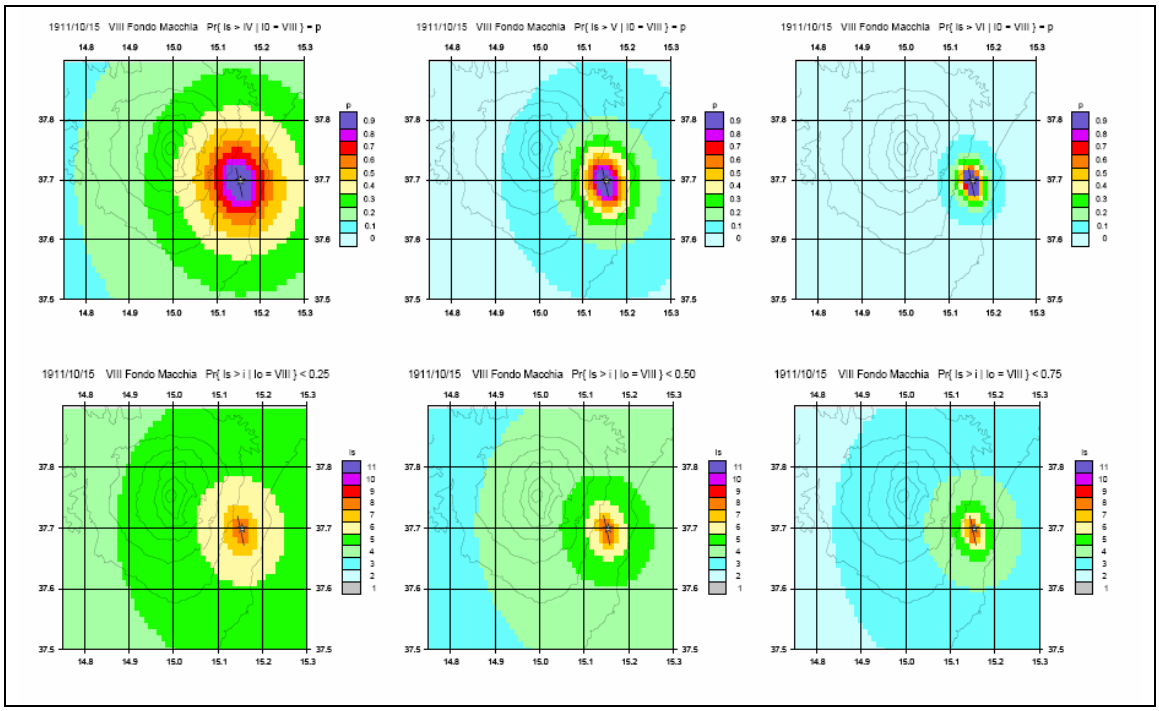


Fig. 2 Graphical representation of PROSCEN; case of Fondo Macchia

Main references

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[2] Zonno. G., Azzaro R., Rotondi R., D'Amico S., Tuvè T. and Musacchio G. (2008): Probabilistic procedure to estimate the macroseismic intensity attenuation in the Italian volcanic districts. *Proceedings of 14th World Conference on Earthquake Engineering, Beijing (China), 12-17october, 8 pp., available on http://www.earth-prints.org/handle/2122/4212.*

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[4] Rotondi R., Azzaro R., D'Amico S., Tuvè T., Zonno G. (2010). Forecasting macroseismic scenarios through anisotropic attenuation: a Bayesian approach. *Proceedings of the Fifth International Workshop on Applied Probability, Colmenarejo, Madrid, Spain, 5-8 july, pp. 3*

[5] Rotondi R., Azzaro R., D'Amico S., Tuvè T., Zonno G. (2010). Forecasting seismic scenarios in the Mt. Etna region (Southern Italy) through probabilistic intensity attenuation models: a Bayesian approach. *Abstract presented at 32nd General Assembly of the European Seismological Commission, September 6-10, Montpellier, France.*